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Part III: Clinical Departments and Divisions Continued --- Chapter 34: Plastic Surgery; Chapter 35: Transplantation Surgery; Chapter 36: Division of Colorectal Surgery; Chapter 37: Trauma Service; Chapter 38: Pediatric Surgery and Chapter 39: Department of Anesthesiology (pages 610-636)

CHAPTER THIRTY-FOUR

Plastic Surgery

JAMES W. FOX, IV, M.D.

"If the world never suspects the face has been lifted, that is the true test of your handicraft."

—SIR HAROLD GILLIES (1882–1960)
and Dr. Ralph Millard, Jr. (1919–)

PLASTIC SURGERY denotes a branch of surgery in which shifting or readjustment of tissues is undertaken for the treatment of congenital or acquired deformities and for the improvement of function, comfort, appearance, or contour. Although these words quite adequately describe the creed of plastic surgery as practiced today, they were written by Dr. John Bingham Roberts (Jefferson, 1874) over 100 years ago. The history of plastic and reconstructive surgery at Jefferson actually began with Dr. Joseph Pancoast (Figure 34-1).

Dr. Pancoast, the second Chairman of Surgery at Jefferson (1839–1841), was probably the most prolific American author of articles on plastic procedures of the nineteenth century.[1] He was favorably compared with the European plastic surgical greats of his time, including Dupuytren, Roux, and Velpeau of France, Diffenbach of Germany, and Liston of England. During Pancoast's 35 years of practicing and teaching at Jefferson, he introduced the procedure of rhinoplasty, devised the original dacryo-cysto-rhinostomy for lacrimal duct occlusion and epiphora, described the first myotomies for correction of strabismus, performed the first composite pedicle flap transfer (hair-bearing scalp to replace an eyebrow lost in a fire), developed the first procedure to address velo-pharyngeal incompetence in the cleft palate patient, originated the first genitourinary congenital repair (closure of bladder exstrophy with pedicle flaps), and perfected the procedure of neurotomies in the surgical treatment of facial tics.[2]

Pancoast's greatest contribution is probably his most overlooked. In his famous work, *Treatise on Operative Surgery* (1844), Pancoast describes the procedure of free skin grafting: "In several instances a portion of integument has been entirely detached from the arm or thigh and at once applied on the surface of the open wound." This statement on free skin grafting antedates by 30 years the epochal works of Thiersch published in 1874.

The Third Chairman of Surgery at Jefferson was Dr. Thomas Dent Mütter (1841–1856). Mütter (Figure 34-2), in the words of Pancoast's commemorative lecture of 1859, "had witnessed, while abroad. . . . the great domain in plastic surgery,"[3] which he put to use at Jefferson. He made an exhaustive study of scar formation and the characteristics of burn scar and contracture. Burns were the most common injury at that time because of the always-present open flame used in heating, cooking, and illumination of the house, school, and workplace. The surgical treatment and release of these horrible deformities using rotation and tube pedicle flaps, local Z-plastics, and running W-plastics, as reported by Mütter, entitled him to "claim the merit of having first performed an operation for relief of extensive cicatrices."[4]

Even though possibly Jefferson's greatest surgeon, Dr. Samuel D. Gross, the Fourth Chairman of Surgery at Jefferson (1856–1882), contributed little to the growing specialty of plastic surgery; he did write on refinements in strabismus surgery.

An 1874 Jefferson graduate, Dr. John Bingham Roberts contributed much to the field of plastic surgery. Roberts, a member of the first detached Jefferson Hospital staff from 1877 to 1879, did most of his significant medical writing after leaving Jefferson.[5] His literary output later described septorhinoplasty repair and pin fixation of midface fractures and soft tissue reconstruction of the "tumor, caustic or syphilitically" deformed nose. When at Jefferson, Roberts espoused two principles, one medical and the other philosophic, which were examples of the Jefferson-trained physician. At the time of his award of the Gross Surgery Prize at graduation, he stated that "the devastating effect of physical deformity on the mental attitude of the afflicted individual must always be treated by the tending physician." Later,

FIG. 34-1. Joseph Pancoast, M.D. (1805–1882); Second Chairman of Surgery (1839–1841), Fifth Chairman of Anatomy (1841–1874), and pioneer in plastic surgery.

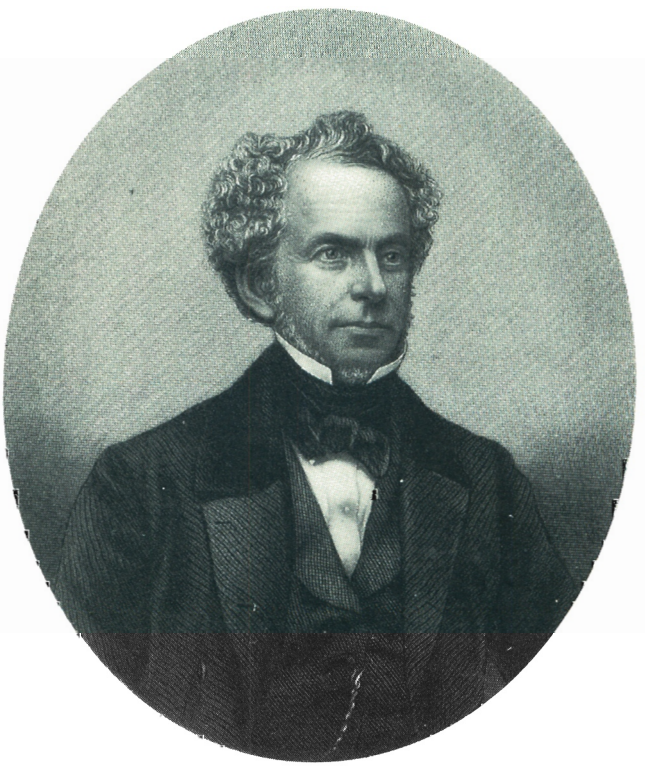

FIG. 34-2. Thomas Dent Mütter, M.D., LL.D. (1811–1859); Third Chairman of Surgery (1841–1856), and pioneer in plastic surgery for burn scars and contractures.

during his two-year period of lecturing to Jefferson students, he suggested that they never forget that "one's birth and social position are merely accidental and that individuals are accepted and valued solely by their merits."

An 1879 Jefferson graduate, Dr. Archimedes Rose of Kentucky, provided a bridge from the early history of plastic surgery at Jefferson of the late nineteenth century to the more organized period beginning in the early twentieth century. Dr. Rose, after completing his education at Jefferson, returned to his Marion County, Kentucky, home to practice. There he crossed paths with Warren B. Davis, a young man raised in Jessamine County, Kentucky, and educated at Kentucky University. Young Davis developed an interest in medicine, matriculated at Jefferson in 1906, and graduated in 1910. When at Jefferson, Davis (Figure 34-3) was elected to Alpha Omega Alpha (an honor medical fraternity) and won the graduation prizes in oral surgery, gynecology, obstetrics, and pediatrics.[6] To the casual observer these various prizes might seem unrelated, but careful consideration reveals that an interest in these subjects could very easily translate into a career caring for the congenital anomalies of the newborn, child, and adolescent patient.

Following an 18-month internship at Jefferson, Warren Davis was awarded the Corinna Borden Keen Research Fellowship and entered the research laboratory of Dr. Ludwig Pick at the University of Berlin. This research effort resulted in a monograph describing the development and anatomy of the nasal accessory sinuses. Upon his return to Philadelphia in 1913, Davis was appointed to the surgical staff by Dr. J. Chalmers DaCosta. He was also appointed to the teaching staff of the Anatomy Department and subsequently held the appointment of Professor of Oral Surgery.[7]

At about this time, Dr. Warren Davis met two other Dr. Roses, neither related to each other nor to the Dr. Rose of Kentucky. Horace Rose (Jefferson, 1903) worked at the Camden Children's Clinic. Dr. Clarence Atwood Rose (Jefferson, 1913) would practice at the Spitzka Anatomic League Children's Dispensary (Blockley Hospital and, subsequently, Philadelphia General Hospital). Dr. Horace Rose first demonstrated cleft palate surgical repair to Warren Davis. Later, Dr. Clarence Rose would provide anatomic data that eventually led to Davis's scholarly approach to congenital anomalies including his published techniques first describing osteoplastic flaps for the repair of cleft palate.

During World War I, Dr. Davis, as a Captain in the Medical Corps, was in charge of the School of Oral and Plastic Surgery at Fort Oglethorpe, Georgia. The major textbook of the period with respect to facial injuries, *War Injuries of the Face*, was published in 1919. The author was none other than the Jefferson graduate of 1874, Dr. John Bingham Roberts.

Dr. Davis returned to Jefferson after the War and went on to be involved at the very inception of development of the surgical subspecialty of

FIG. 34-3. Warren B. Davis, M.D. (1881–1947), Professor of Oral Surgery and pioneer in the repair of congenital facial deformities of children.

plastic and reconstructive surgery. In 1925 he met with 11 other physicians in Philadelphia, most of whom had both medical and dentistry degrees. This led to the incorporation of the American Association of Plastic Surgeons in 1927 in New York, of which Davis became the Senior Trustee in 1935.

Out of this group grew an educational forum, with a goal to spread the principles and techniques of surgeons who confined their practices solely to plastic surgery. Thus another organization, the American Society of Plastic and Reconstructive Surgeons, was born in 1931, with Jefferson's Warren B. Davis as one of the original 12 members. This specialty society was approved by the American Board of Medical Specialists and was made the licensing board for plastic surgery. Davis became its third President (1936–1937).[8]

Because of Davis's early leadership in the Society and his erudite manuscripts in the surgical literature, when the Society instituted its own journal in 1946, *Plastic and Reconstructive Surgery,* Warren Davis was chosen as its first Editor. He held this position until his death in 1947. Because of his stalwart leadership in bringing this publication into being, a fellow plastic surgeon, Dr. Lyndon Peer, wrote that "*Plastic and Reconstructive Surgery* will be a permanent memorial to Dr. Warren B. Davis." Dr. Davis was President of Jefferson's Alumni Association in 1942 and President of the Pennsylvania Society of Plastic Surgeons from 1935 until 1947.

Another plastic surgeon on the staff at Jefferson during this period was Dr. John Gunter, licensed as a medical doctor and also as a dentist. Dr. Gunter worked on the Oral Surgical Staff of Warren Davis from 1919 until 1923.

A 1925 Jefferson graduate, Dr. John D. Reese (Figure 34-4), was an associate of Dr. Davis until 1929, when he entered solo practice. Dr. Reese practiced at Jefferson for 32 years. His famous contribution to the medical world was his skin-graft-harvesting instrument called the "Reese Dermatome." His interests in the surgical physiology of the skin pertaining to its successful transplantation and his early training as a chemist led to his developing this instrument. Reese's unique breakthrough was made possible by his experimentations in rubber chemistry culminating in his technique for "vulcanizing" a synthetic rubber sheathing to a cord supportive layer. This same process was later used in the tire manufacturing industry. Reese's instrument greatly advanced the procedure of skin grafting, as it provided a technique to accurately harvest uniform thicknesses of skin under normal skin tensions.

Another member of the plastic surgical staff at Jefferson was Dr. Charles LaClair. He practiced plastic surgery and otolaryngology at Jefferson from 1932 until 1940, and during World War II he was a member of Jefferson's Base Hospital No. 38.

Dr. John J. Duncan (Jefferson, 1937) practiced at Jefferson from 1939 until 1961, with four years (1941–1945) spent as a medical officer in the China-Burma-India Theater during World War II. He first practiced in association with Dr. Warren B. Davis at Jefferson and subsequently with Dr. Warren Davis's son, Dr. J. Wallace Davis.

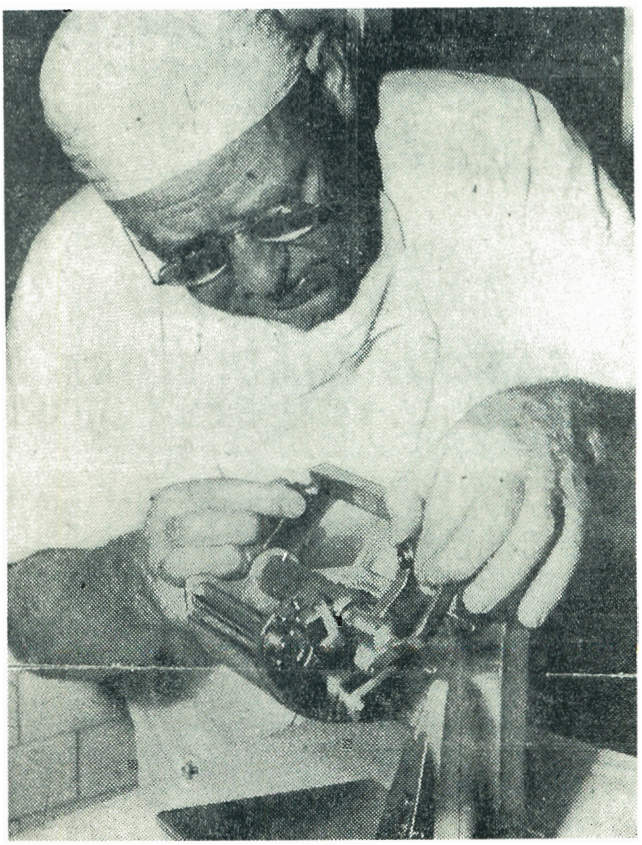

FIG. 34-4. John D. Reese, M.D. (1893–1958), Clinical Professor of Plastic and Reconstructive Surgery and inventor of the "Reese Dermatome."

Dr. J. Wallace Davis (Jefferson, 1942), after spending the years 1943 to 1946 as a Major in the Medical Corps in the China-Burma-India Theater during World War II, returned to Jefferson for training under his father. He subsequently associated in practice with his father and Dr. Duncan. As one of the early pioneers in cosmetic surgery (Figure 34-5), he was one of the original proponents of psychologic good health, considering it to be equally as important as physical good health. Because of his leadership in the field of aesthetic plastic surgery, he gained national recognition in his specialty and served first as an officer and subsequently as a Director and Board Trustee of the American Society of Plastic and Reconstructive Surgery. He also served as the President of all the local and regional Plastic Surgical Societies as well as being Chairman for Alumni Annual Giving at Jefferson for 26 years. He received Jefferson's prestigious Cornerstone Award in 1978.

Dr. Herbert Lipshutz (Jefferson, S1944) returned after World War II and completed his plastic training in 1952 at Jefferson, where he practiced until 1963, at which time he transferred to Pennsylvania Hospital.

Dr. Jose Castillo joined the plastic surgical staff in 1970 when Dr. Harry Goldsmith was appointed Chairman of Surgery. Dr. Castillo left in 1974 to enter practice in South New Jersey.

Dr. James W. Fox, IV (Jefferson, 1970) took his general surgical residency at Jefferson (1970–1974) and extended his training into plastic and reconstructive surgery at the University of Virginia, Charlottesville (1974–1976). He then joined the Surgery Department at Jefferson as Assistant Professor in the teaching of his specialty and also joined Dr. J. Wallace Davis in private practice. Dr. Fox's interests have dealt primarily with breast reconstruction, about which he has published 28 scientific articles. He also has been involved in advancement of myocutaneous flap technology and its applications to clinical reconstructions, especially involving the lower extremity.

Plastic and reconstructive surgery at Jefferson has witnessed a rapid explosion of implant technology, the perfection of microvascular surgical techniques, and the never-ending search for further improvements.

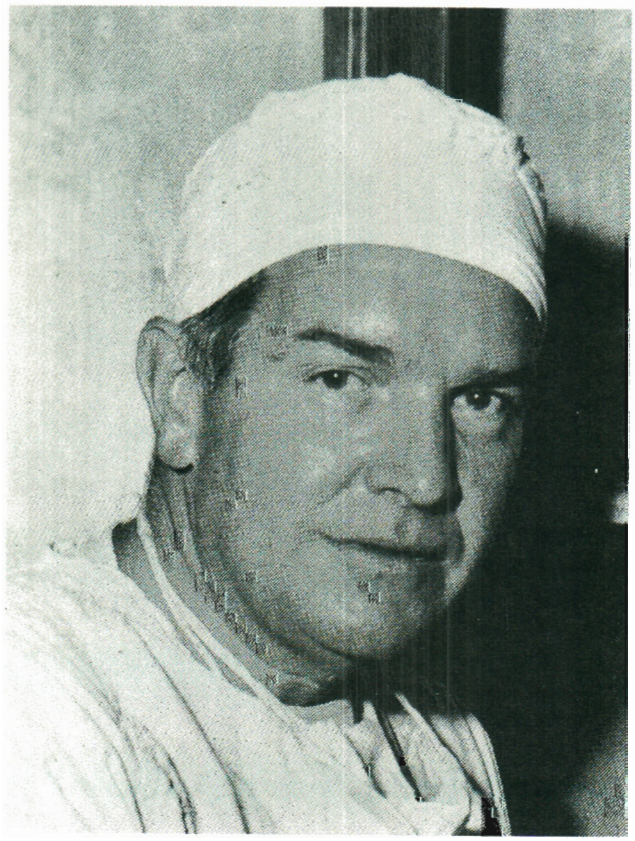

FIG. 34-5. J. Wallace Davis, M.D., an early pioneer in cosmetic surgery.

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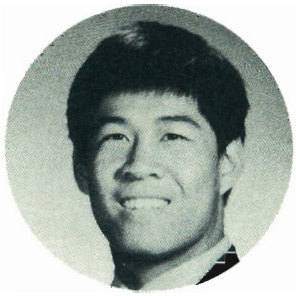
CHAPTER THIRTY-FIVE



Transplantation

BRUCE E. JARRELL, M.D., AND JONATHAN C. FONG, M.D.

"The solution of the cross-grafting mystery . . . may be as revolutionary as fission of the atom." —SIR HAROLD GILLIES (1882–1960)

THE GROUNDWORK for transplantation capability at Jefferson was laid by Dr. Herbert E. Cohn (Jefferson, 1955) who, as a Jefferson surgical resident, cultivated his interest in nephrology (Figure 35-1). His training completed, Dr. Cohn teamed with Dr. James E. Clark (Jefferson, 1952) to provide renal patients with the most comprehensive surgical and medical care available at the time. The joint effort resulted in a renal dialysis unit affording centralized access for all Delaware Valley kidney patients. Dr. Cohn, after several years of research devoted to improving the methods of dialysis, became increasingly aware of the need for an alternative in the palliation and cure of renal failure. He accepted the challenge of developing the skills needed for kidney transplantation by traveling to well-known transplant centers across the nation. This was rewarded in 1965 when Dr. Cohn ushered in the transplant era at Jefferson with the first transplant of a cadaver kidney. Seven others were done between 1965 and 1968. Dr. Cohn performed the actual transplantation and the care required by the donor, and the recipient was supervised before and after surgery by Dr. Norman Lasker and the Nephrology Division. In 1972, Dr. James F. Burke, Jr., (Jefferson, 1966) joined Dr. Lasker in caring for renal transplant patients. A major contribution was Burke and Lasker's development of a clinical protocol for screening prospective donors and recipients. Their clinical research enhanced the care of renal patients and improved the success rate of the transplants.

From its inception, several obstacles faced the fledgling program. Two major problems were procuring the organs without the support of a regional or national center and gaining the general public acceptance of transplantation as a viable alternative. The underlying cause of the public's rejection of transplantation as a treatment modality was the controversy surrounding the condition of "brain dead" as a classification of clinical death. The objections began to lessen when Dr. Christian Bernard of South Africa successfully completed the first heart transplant in 1967. Literally overnight, transplantation became a household term, and programs began to spread throughout the country.

The modern era of therapeutic transplantation at Jefferson began in 1972. In January of that year Dr. Cohn performed the first successful renal

transplant. The kidney came from an identically matched sibling and contined to provide full renal function for the recipient for over ten years.

A major commitment to a full program of renal transplantation was made by the appointment of James E. Colberg, M.D., (Figure 35-2) to establish and direct the Transplantation Service. Dr. Colberg came from Albany Medical College, where he had cofounded and codirected a successful clinical renal transplant program and was director of the tissue-typing laboratory of the Renal Disease Institute of the State of New York.

A major component of the Transplantation Service was the tissue-typing immunology laboratory, which was established with Drs. James Colberg and Steven I. Bulova as codirectors for the proper screening and matching of donors and recipients. Another important emphasis was on cadaver organ procurement for transplantation.

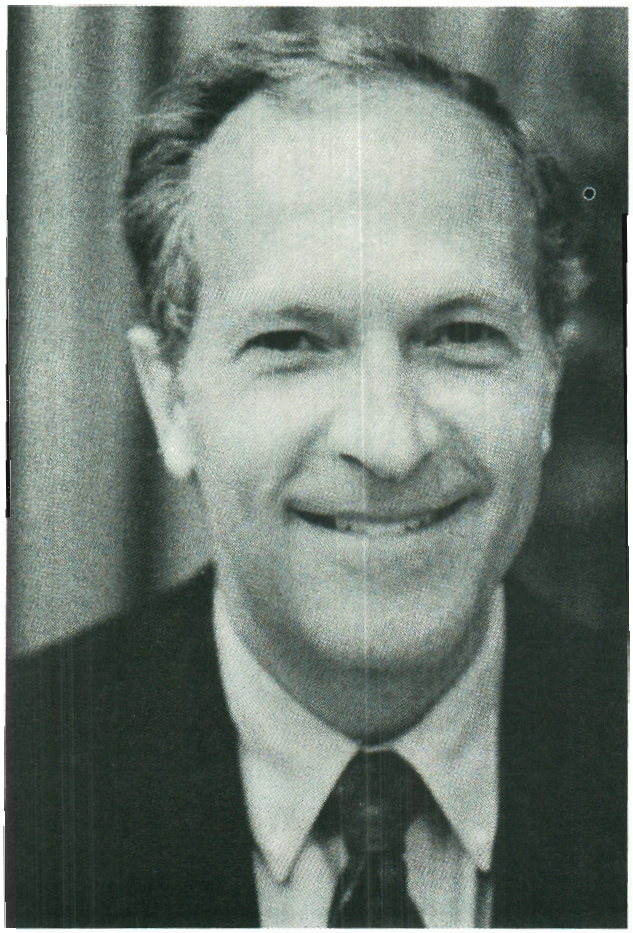


FIG. 35-1. Herbert E. Cohn, M.D., a pioneer in renal transplantation and Vice-Chairman of the Department of Surgery (1985–).

Because the whole concept, especially that of brain death, was new, extensive education was necessary in the Jefferson affiliated hospitals. Operative protocols including preoperative care, and immunosuppression for postransplant rejection episodes were developed.

A renal transplant team was established with members from Nephrology, Urology, and Surgery. Drs. Herbert Cohn and Jerome Vernick from the Surgery Department participated in the program. Dr. Colberg performed the first successful non–identically matched renal transplants at Jefferson. On February 16, 1973, he performed the first successful parent and child transplant, and on March 12 of that year, the first successful cadaver donor renal transplant.

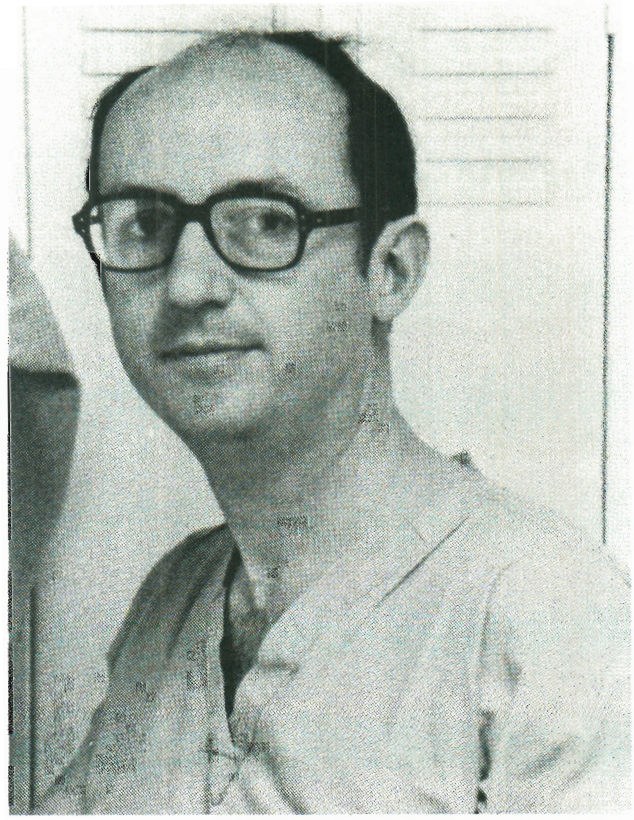


FIG. 35-2. James E. Colberg, M.D., headed the renal transplantation and its ancillary services (1972–1980).

Longer preservation of donor kidneys became necessary. In 1973 Dr. Colberg established a laboratory for preservation of kidneys up to 72 hours.[1] Research programs in renal preservation and immunogenetics were begun, as well as transplant conferences for teaching and patient care.

In 1974, with the encouragement of the Chairman of Surgery, Dr. Harry S. Goldsmith, and the Director of the Dialysis Unit, Dr. Norman Lasker, a coordinated program was established with Our Lady of Lourdes Hospital. After two identical twin transplants were performed there, Our Lady of Lourdes Affiliate decided to develop its own South New Jersey Transplant Program. This resulted in the loss of many potential referrals to the Jefferson Transplant Program.

A very important achievement in these years of intense competition in Philadelphia among Jefferson and the fine, well-established transplant programs of the University of Pennsylvania, Hahnemann, Albert Einstein Northern Division, Lankenau, and Saint Christopher's was the establishment by the Heads of the six programs of the Delaware Valley Transplant Program of a regional procurement agency. It has continued to be one of the largest and most successful in the country.

The Jefferson program in the years 1972–1980 had results equal to those elsewhere, yet it did suffer from a relatively low number of transplants, approximately 15 per year. Cadaver renal transplants, the majority of those done, were at a plateau of results throughout the country of 45% functioning at one year. Nephrologists were somewhat reluctant to refer patients for transplantation due to the results and due to the lack of Federal pressure.

A new clinical research program at Jefferson in collaboration with the University of Minnesota and the National Institutes of Health was begun, using antilymphocyte globulin as a new and less toxic immunosuppressive agent in 1978–1979 in order to improve results.

When Dr. Francis E. Rosato was appointed Chief of Surgery in 1978, one of his plans was to establish a strong transplant service that would have the capability of performing not only kidney transplants but also liver and heart. A successful program was accelerated in 1980 by the appointment of Dr. Bruce E. Jarrell (Jefferson, 1973), whose credentials included previous work with Dr. Lasker in developing the prototype of the peritoneal dialysis machine used in most hospitals today. During his residency and transplantation Fellowship at the Medical College of Virginia, Dr. Jarrell had gained invaluable experience in transplantation with Drs. H.M. Lee and James Wolf. Dr. Jarrell provided a leadership and vision that within five years transformed an ancillary service into one of the largest transplant centers in the country. Among the factors contributing to the success of the program was Jefferson's provision of financial support and long-term commitment. Resurgence of the transplant program was additionally aided by Dr. Jarrell's efforts to increase the patient pool by expanding the area coverage for referrals. This included South Jersey, Delaware, and Central Pennsylvania. At the same time, Dr. Rosato was establishing the necessary contacts to gain the confidence and support of the hospitals in these outlying areas.

Research in the intervening years improved the techniques of transplantation and patient care.[2–4] In addition, the development of cyclosporin, an immunosuppressive agent, allowed more leeway in the matching of disparate donor and recipient tissue. This in turn increased the number of organs available for transplantation. By 1985 Jefferson had the twenty-seventh largest kidney transplant service in the United States, with over 75 transplants per year.

In the spring of 1981, Dr. Willis C. Maddrey was appointed Chairman of the Department of Medicine. He was vitally interested in Jefferson's long-term goal of a liver transplant capability. The following year a visit was made to the foremost liver transplant center at the University of Pittsburgh headed by Dr. Thomas E. Starzl. All those who would be involved in the transplant procedure at Jefferson were represented in this visit. These included Dr. Shuin Yang, who trained under Dr. Starzl during the preceding year, along with Dr. Bruce Jarrell and Dr. R. Anthony Carabasi, III (Jefferson, 1977), who represented the Surgery Department. The Anesthesiology Department, represented by Drs. James Zvargulis and Joseph L. Seltzer (Jefferson, 1971), worked with Dr. Kang of the Pittsburgh team to develop

the protocol. Work was begun at Jefferson to establish laboratories needed to hone the technical skills required to perform the complex procedure. Experience with the operation was acquired initially on dogs and pigs. A suitable patient was found in a 30 year-old white male whose only systemic illness was sclerosing cholangitis.

Michael Donahue entered the operating room on May 31, 1984, with no hope for a medical cure and 12 hours later left with a new lease on life. The ease with which the operation was performed and Michael's rapid recovery were a tribute to the careful planning of the first successful liver transplant in Philadelphia.

While kidney transplants continue to dominate the service, a case load of 15 to 20 liver transplants per year is anticipated. Research continues on both endothelial cell seeding of arterial grafts and pancreatic islet cell transplants. In the future, transplantation of other organs is anticipated to establish Jefferson as a complete transplantation center.

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CHAPTER THIRTY-SIX

Division of Colorectal Surgery and the Comprehensive Rectal Cancer Center

GERALD J. MARKS, M.D.

"There is a fundamental principle in medicine, whenever the stool is withheld or is extruded with difficulty, grave illnesses result."

—MISHNEH TORAH

THE ESTABLISHMENT of the Division of Colorectal Surgery followed a period of innovation in colon and rectal surgery. Pioneering efforts occurred in anal sphincter-preservation surgery, in the management of the radiation-injured intestine, and in flexible fiberoptic colonoscopy.[1,2] The latter procedure was launched by a national cooperative study originating at Jefferson. These efforts resulted in national and international attention for this institution. The country's first production-model colonoscope was in use at Jefferson in 1969, and the first colonoscopy symposium held in the world was Jefferson-sponsored in 1974.

The success of these activities resulted in encouragement by the American Society of Colon and Rectal Surgeons to establish a university-based colorectal surgical residency program. Dean Joseph Gonnella and Surgical Chairman Francis Rosato authorized the establishment of the Division of Colorectal Surgery in 1984. Dr. Gerald J. Marks (Jefferson, 1949) was appointed Director.

Subsequent American Medical Association approval led to acceptance of Dr. Ignacio Echenique as the first in the residency program in July, 1985. The Division staff was augmented to include Drs. Harold Rovner, Alan M. Resnik, Scott D. Goldstein, and Maryalice Cheney (the second Resident trained).

The Comprehensive Rectal Cancer Center began as a working group of over 20 scientists from a variety of basic science and clinical specialties. This multiinstitutional network of scientists focused on the study and management of rectal cancer based on a program begun in 1975 utilizing sphincter-preservation surgery following full-dose preoperative radiation therapy. The clinical program not only comprised the largest series of full-dose preoperative radiation therapy for rectal cancer and sphincter preservation but also the largest series of sphincter preservation for cancers of the distal six cm. of rectum. The Jefferson experience is cited as a breakthrough in the multimodality management of rectal cancer, in which both the quality of life and survival are enhanced.[3]

Incorporated in the Comprehensive Rectal Cancer Center is a Colorectal Cancer Genetic Center and a Familial Polyposis Registry in collaboration with the Wistar Institute, in which a major grant was awarded by the National Cancer Institute. Joining Dr. Marks are, among others, Drs. Mohammed Mohiuddin, Laird G. Jackson, Harry S. Cooper, Michael Mastrangelo, Harvey Brodovsky, Scott Goldstein, Maryalice Cheney, and Ursula Hahn. The Center, located in the Medical Office Building at 1100 Walnut Street, is viewed as the only one of its kind.

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CHAPTER THIRTY-SEVEN

Hospital Trauma Service

JEROME J. VERNICK, M.D.

"A wound heals but the scar remains."

—ENGLISH PROVERB

JEFFERSON HAS produced individuals who contributed to the care of trauma patients over its entire history. In the 30 years between 1877 and 1907, the first detached Jefferson Medical College Hospital at the site of the present Thompson Annex treated nearly 50,000 accident cases (Figure 37-1). From 1907 until opening of the Curtis building in 1931, all accident cases were received on the street level of Old Main Hospital from the entrance on the south side. From 1931 the emergency room on the second floor of the Curtis Clinic was handicapped by a slowly operating elevator. The current emergency department in the Thompson Annex was constructed in the mid-1960s and represented a vast improvement. Plans are now under way for a project for completion in 1990 that will include a state-of-the-art emergency room/trauma center complex occupying the entire first floor of the Main and Thompson buildings.

Trauma training of Residents was recognized as a deficiency in the early 1980s, then overcome by rotating the Residents through trauma programs in Maryland and later at Cooper Hospital in Camden. Jefferson's commitment to trauma increased during this time. The Hospital provided limited funding to start a trauma registry and begin efforts in improving trauma care and training. The advanced trauma life-support course sponsored by the American College of Surgeons became available in 1981. Jefferson was the first institution in Philadelphia to require this course of all house staff in surgery prior to their exposure to the public. This program has now encompassed neurosurgery and orthopaedic surgery as well as other disciplines.

In 1981 Jefferson Hospital began to participate in the major trauma outcome study. This was used as a nucleus for a trauma registry that has now become a sophisticated computer-based data-collection tool, which is an integral part of the Pennsylvania Trauma Systems Foundation's registry and has served as a model for several other trauma programs.

Trauma center designation began with major problems and delays in the mid-1980s. After legislation was obtained through the Commonwealth of Pennsylvania, Jefferson successfully qualified as a Level I regional resource trauma center. This accreditation was renewed in 1987 for two years, the maximum level of approval offered by the State.

The trauma program employs a trauma director on the full-time faculty, a trauma nurse coordinator, a trauma data and research nurse, and an administrative secretary. Efforts are under way to recruit an additional full-time critical care trauma surgeon. The quality assurance department has a full-time trauma quality assurance person, and the social service department is recruiting a

full-time trauma social worker. A full-time registered nurse has recently been added to serve as a public educator coordinator. The trauma program has established an outreach trauma prevention program that, in its first year, presented over 50 programs to area schools and provided this service for over 10,000 of its students.

The trauma program depends on advanced trauma life-support-certified attending surgeons, of which there are eight participating in the call roster. Residents, who provide the first line of defense for in-house trauma coverage, will obtain all of their trauma training at Jefferson when commitment to Cooper Hospital expires in 1988. The emergency department has always been an essential part of trauma care, and is a Division in the Department of Surgery.

Active basic research in trauma-related subjects is being carried out by Dr. Allan M. Lefer and his staff in the Physiology Department and by Dr. Susan Jacoby and her staff in the Surgery Department. Clinical research is being conducted by most members of the Trauma Attending Faculty.

Jefferson participates in a helicopter consortium known as Sky-Care, which provides capability to move appropriate patients by air. This has been regarded as a patient-care tool rather than a marketing tool and has helped to maintain a valid perspective in moving patients without incurring unnecessary expenses that are generated by in-house helicopter programs.

Current plans include consideration of a critical care ground transport team, which should provide essential urban environment service. Jefferson's commitment to trauma programs foretells significant contributions in the years to come.

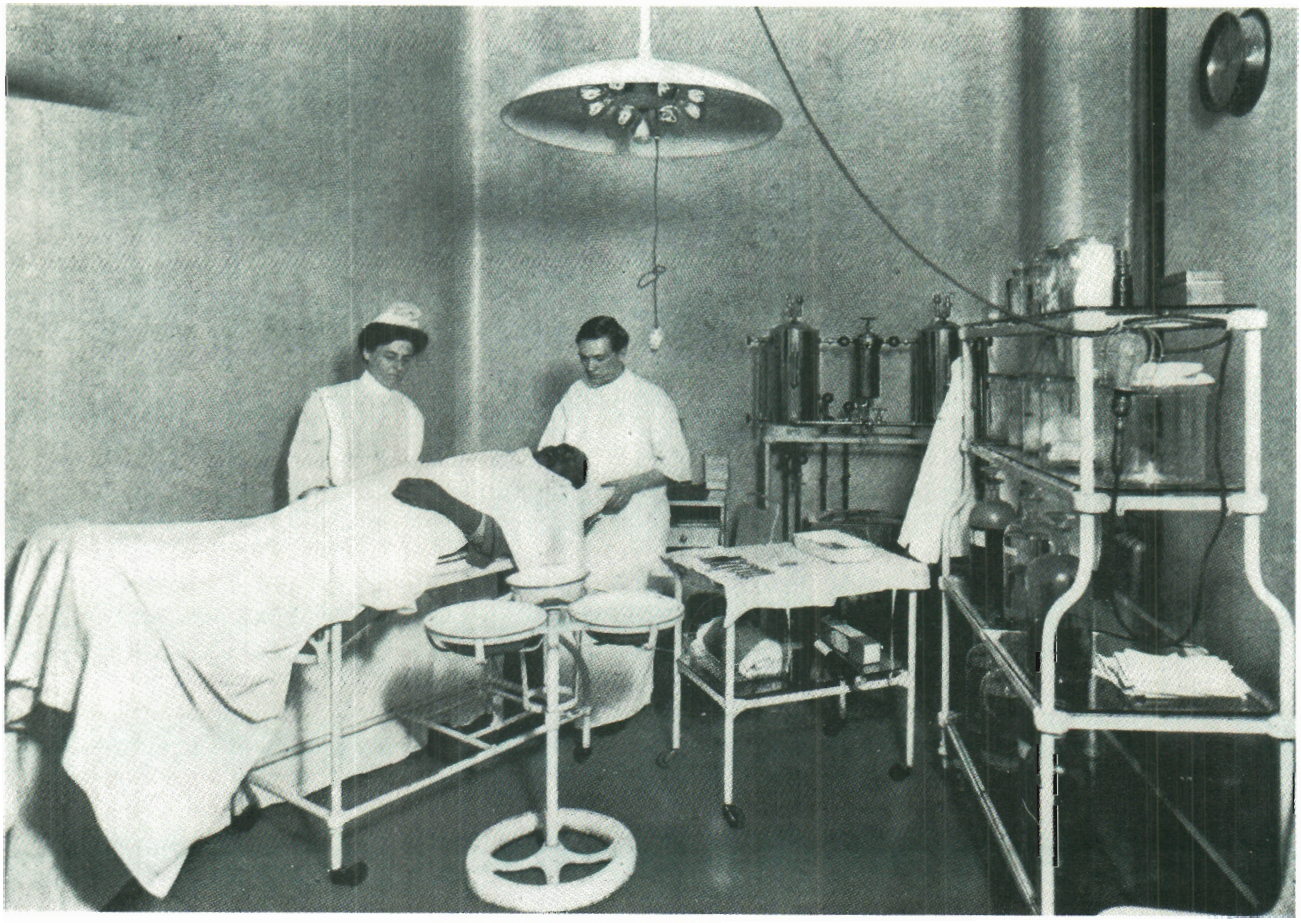

FIG. 37-1. An accident case brought by ambulance to the emergency room of the 1877 Hospital (ca. 1900).

CHAPTER THIRTY-EIGHT

Pediatric Surgery

PHILIP J. WOLFSON, M.D.

"There are few satisfactions that are greater than the operative correction of an anomaly which restores a child to perfect health—a feat which can be accomplished in a surprisingly high percentage of cases." —ROBERT E. GROSS, M.D. (1905–)

AT THE turn of the century little distinction was made between diseases of children and adults. The much higher mortality rates in the young pointed out with increasing emphasis that children could not be considered as diminutive adults. Furthermore, infants and children were subject to types of infections and congenital malformations infrequently encountered in adult life. Surgery in children remained the domain of the general surgeon. In the 1920s, Dr. William E. Ladd at Harvard pioneered in gathering together the special knowledge of the pathology and best procedures required for surgical treatment of children. This culminated in his classical book in 1941, *Abdominal Surgery of Infancy and Childhood,* coauthored by Robert E. Gross, M.D. Ladd became duly regarded as the "Father of Modern Pediatric Surgery." Gross widened the field further in 1953 with publication of his book, *The Surgery of Infancy and Childhood*, which included abnormalities in the thorax and cardiovascular system.

Through the 1940s to most of the 1960s, surgeons at Jefferson operated upon pediatric patients as a routine in their field, not only adopting the technical advances of the time but also the improvements in pre- and postoperative care. The names of Drs. Warren B. Davis, Thomas A. Shallow, William T. Lemmon, Kenneth E. Fry, Frederick B. Wagner, Jr., and Robert G. Johnson are associated with this period. The transition to staff with extra training and interest in pediatric surgery occurred with the appointment of Peter S. Liebert in 1968, Louis F. Plzak, Jr. in 1971, and Candadai S. Rangaratham in 1972. The former two performed cardiothoracic surgery in adults as well, while the latter restricted his activity solely to infants and children. Dr. Rangaratham was

regarded as the pediatric surgeon in the Department from 1972 until his resignation in 1979. Despite commendable performance, his progress was frustrated by lack of accreditation by the American Board of Surgery, his passive personality, and the paucity of cases.

In June, 1972, the American Board of Surgery acted "to recognize Pediatric Surgery as an area within Surgery deserving special recognition, to establish requirements for Certification, establish examination procedures and issue Certificates of Special Competence." In 1974, the American Board of Medical Specialties approved the granting of Special Certificates by the American Board of Surgery. The Residency Review Committee for Surgery assumed the responsibility for accreditation of residency programs in this discipline. The first cycle of certifications was completed in 1975.

In 1982 Dr. Philip J. Wolfson was appointed Director of the Section of Pediatric Surgery. A native of the Bronx, New York, he had received his M.D. degree from the Mount Sinai School of Medicine (1974) and served his internship at the Royal Victoria Hospital in Montreal, Quebec (1974–1975). Following a residency in general surgery at the Mount Sinai Medical Center (1975–1979), he took additional training in pediatric surgery at the Montreal Children's Hospital in Quebec (1980–1982). He subsequently became certified by the American Board of Surgery and received the Certificate of Special Competence in Pediatric Surgery.

An inherent problem in building up an adequate Pediatric Surgical Service was the presence of two children's hospitals, Children's Hospital of Philadelphia (founded in 1855) and St. Christopher's Hospital for Children (established in 1875). Jefferson, however, was a high-risk perinatology center with a very sophisticated Intensive Care Nursery. In addition, the relationship with Mercy Catholic Medical Center, a Jefferson affiliate with a very active general pediatric service, was cultivated. Low-risk operations for patients who originated from Fitzgerald Mercy were performed at that institution, whereas infants with surgical conditions requiring tertiary care (such as at a Pediatric Intensive Care Unit) were transferred to Jefferson.

The number of operations performed yearly on children at Jefferson increased steadily from 168 in 1982–1983 to 306 in 1987. Recruitment of a Pediatric Anesthesiologist as well as a Pediatric Intensivist contributed significant expertise in treating very ill pediatric surgical patients.

Antenatal ultrasound has been increasingly successful in identifying congenital structural abnormalities requiring surgical correction shortly after birth. Such early diagnoses have allowed for prenatal parental counseling and usually maternal transport to Jefferson for a planned delivery there. Specific congenital anomalies that have been identified prior to birth and treated successfully at Jefferson include esophageal atresias, duodenal obstructions, jejunal artesias, abdominal wall defects, and neck masses.

Jefferson, as of 1987, is the only institution in the Delaware Valley with an established neonatal Extracorporeal Membrane Oxygenation (ECMO) program. ECMO is the use of a modified heart-lung machine to provide gas exchange for temporary pulmonary support. It has been demonstrated to be lifesaving for a select group of neonates with respiratory failure unresponsive to maximal intensive conventional treatment.[1] In June, 1985, after two years of animal experimentation, a moribund infant was placed on ECMO at Jefferson and survived. Since that time over 40 neonates with predicted mortalities of 90% from respiratory failure have been treated with ECMO; 90% of these babies have survived.

Preliminary research in fetal lambs has investigated the use of ECMO circuit to function as an artificial placenta, providing metabolic needs for the fetus, such as gas exchange, nutrition, and excretory function.

The Section of Pediatric Surgery is strengthening its role in education of the medical students, in the training of residents in general surgery, and in the operative care of this special group of patients.

Reference

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CHAPTER THIRTY-NINE

Department of Anesthesiology

JAY J. JACOBY, M.D., PH.D.

"And the Lord God caused a deep sleep to fall upon Adam, and he slept: and he took one of his ribs, and closed up the flesh instead thereof."

—GENESIS 2:21

THE DISCOVERY and development of anesthesia constitute a revolution in the history of medicine. Before the advent of anesthesia surgeons had to be men of steel. They operated upon patients who were screaming, writhing in anguish, and held down by straps, leather belts, and strong men. Lucky patients fainted. The endurance of sick people being limited, the duration of an operation was brief; many were measured in seconds, some in minutes. An operation that lasted an hour was unthinkable. Surgery in the preanesthesia era is vividly described by Thorwald in *The Century of the Surgeon*.[1]

> "The second patient had a tumor of the tongue. As the young man hesitantly sat down, an attendant came up behind him with a portable charcoal burner upon which lay, already glowing white-hot, several surgical cautery irons. The attendant set the burner down where the unfortunate young man could not see it.
>
> "Warren was holding a forceps in his left hand, a scalpel in his right. With his thumb he tested the edge of the blade. One of the resident surgeons, a big, powerful man, stepped up close behind the chair, ready to hold the young man's head. Warren ordered the young man to open his mouth. The patient hesitantly obeyed. As his tongue emerged from the dark opening of his mouth, it was possible to see even at a distance the huge growth that disfigured its tip. Warren's left hand flashed forward and gripped the tongue with the forceps. The young man tried to draw it back, uttering a strangled cry as he did so. But Warren's forceps clamped down hard and drew the tongue further out, while the assistant held the patient's head tightly. Fractions of a second later the knife in Warren's right hand sliced through the tongue with

a single rapid slash. The amputated tip, with the tumor, fell to the ground. Blood gushed out of the stump of the tongue. Warren tossed the scalpel on to the instrument table and stretched his arm out to the side, past the operating chair and far enough so that the attendant could place the handle of a glowing cautery iron into his hand without being seen by the dazed patient. The patient was still uttering gurgling sounds. Warren held the cautery behind his back. With a sudden movement, the resident surgeon covered the patient's eyes with his hands—and Warren pressed the red-hot iron against the bleeding stump of the tongue.

"The patient, struck by frightful pain, tried to jerk his head back. With a mighty effort he pushed himself and the chair several yards across the room. The assistant staggered and barely managed to retain his hold on the patient's head, but Warren followed right after the moving chair. He did not let the tongue go, and kept pressing the iron against the wound. The smell of singed flesh rose up to us. Once the iron slid away and touched the lower lip, but immediately afterward it was again on the wound, cauterizing the last still bleeding remnant of the tongue. Then Warren snapped the forceps open and took a step back. The resident surgeon relaxed his grip. The patient pressed both hands over his mouth. He sprang to his feet, voicing indescribable sounds, and reeled blindly about until two attendants seized him. Warren looked at him coldly, reproaching him for the burned lip and utterly unmoved by the man's torment. 'Well,' he said, 'if you haven't burnt yourself it isn't your fault.' The two attendants led the man out, half tugging, half supporting him."

Considering the horrors of surgery without anesthesia, it is a wonder that anyone was willing to be subjected to an operation. Boiling oil and red hot pokers were in standard use. Most operations that were done then are included in this short list: amputation for fractured or injured limbs (a compound fracture that was not amputated usually meant death from sepsis); incision and drainage of abscess to release "laudable pus"; "cutting for stone" or lithotomy; removal of tumors and bullets; and repair of lacerations. Invasion of body cavities was exceedingly rare. Appendicitis was not even diagnosed in living people, and removal of the inflamed appendix did not begin until after 1886.

The discovery of anesthesia was considered to be the greatest blessing mankind ever received. Since there was no name to describe the phenomenon, scholarly men vied to invent a term to do it justice. Anesthesia being an American discovery, an American finally gave it a name. The famous physician-poet, Oliver Wendell Holmes, put together two Greek words: an = no, and esthesia—sensation. He did not consider the difficulty people would have in pronouncing it and its derivatives. It has also been said that he did not invent the term—he is usually credited with the introduction of the term *anesthetic*, but the word *anesthesia* and adjectives derived from it were in common use throughout the eighteenth century.[2] Because the first successful public administration of anesthesia in the world (October 16, 1846), was done by a dentist, William Morton, at the Massachusetts General Hospital, it was thought that no real knowledge or skill was required to administer it. In America its use was relegated to surgical trainees, medical students, nurses, and sometimes orderlies or family members. For this reason, after its discovery America made no significant contribution to the advancement of the art or science of anesthesia for almost a century.

The Early Years of Anesthesia at Jefferson

When anesthesia was first demonstrated in 1846, Jefferson was already a well-established medical school, and the new discovery was quickly applied. On December 23, 1846, just two months later, the Professor of Surgery, Thomas Dent Mütter, administered the first anesthetic in Philadelphia at his Jefferson Clinic, for removal of a tumor from the cheek. Another physician, Dr. John Kearsley Mitchell, Professor of Medicine, administered ether to a woman in labor at Jefferson, the first obstetrical anesthesia in Philadelphia.

In 1860 a group of Japanese doctors visited the Gross Clinic (Figure 39-1). It is believed that these Japanese were the first ever to visit a clinic in a foreign country. The situation relates to the period of Japan opening its doors to foreign countries. In 1860 the Tokugawa government sent envoys to

Washington, D.C., for the ratification of a Japanese-American Commerce Treaty. The mission stayed in Washington 24 days, and on June 8 began their return journey. On the way, they stopped in Philadelphia. Among the group were three doctors, who with an interpreter, visited the Gross Clinic. The operation being done was for bladder stones, and the anesthetic was administered by none other than the discoverer of ether anesthesia, William Morton, himself. The whole performance was a revelation to the Japanese. They smelled and poured ether on their hands, astonished at the coldness resulting from its evaporation. After the operation, they carefully examined the instruments and showed so much interest that they were invited to visit the College. Among the gifts the group received were medical instruments, an artificial denture on a gold plate, and books on surgery. It can easily be assumed that the Japanese doctors were presented with Dr. Gross's first edition of the *System of Surgery*, which had been published only the year before. It is said that this visit laid the foundation for the modernization of Japanese surgery.[3]

FIG. 39-1. Principal members of Japan's first diplomatic mission to the United States in 1860, wearing formal hakama costumes and swords. (Courtesy of *Nisei: The Quiet Americans* by Bill Hosokawa. N.Y.: 1969, Wm. Morrow & Co.)

The ether used for the first anesthetics was an impure substance called "letheon" and, later, "sulphuric ether." Dr. Edward R. Squibb (Figure 39-2), a Jefferson graduate of the Class of 1845, invented a continuous process for the manufacture of pure ether in 1852. This was the beginning of the large pharmaceutical organization still prominent today.

News of the discovery of anesthesia was carried like wildfire, as fast as stagecoaches and clipper ships could travel to all parts of the world. An English doctor, who had been present at the demonstration at the Massachusetts General Hospital, raced from Boston to London and introduced anesthesia to Europe. Thereafter, only doctors administered anesthesia in Europe, and virtually all the early work on the understanding and improvement of anesthesia was done in Great Britain.

The first full-time specialist in anesthesia in the world was an English general practitioner, Dr. John Snow. As an astute physician, he also became famous for stopping an epidemic of

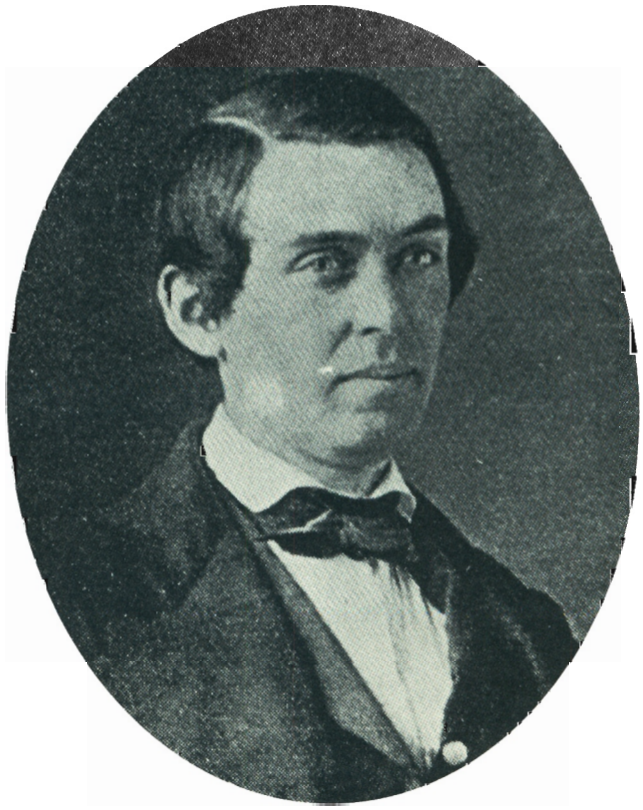

FIG. 39-2. Edward R. Squibb, M.D. (Jefferson, 1845), first manufactured pure ether.

cholera in London in 1854. He noted that the distribution of cases fanned out with diminishing frequency from a particular point. At that hub was a water pump from which the community drew its drinking water. He convinced the police that they should close the pump, and the epidemic was halted. This predated the discovery of germs as the cause of disease. Dr. Snow eventually limited his practice to the administration of anesthetics. He wrote the first two books on this subject: *On the Administration of Ether* and *On the Administration of Chloroform.*

The greatest blessing of mankind was withheld from pregnant women. Clergymen believed that the words of the Bible were to be applied literally. The punishment of Eve when she ate the fruit of the Tree of Knowledge was "In pain shalt thou bear children." Using anesthesia for childbirth was thought to be contrary to the will of the Lord. The first to employ chloroform anesthesia in labor was an Edinburgh obstetrician, Sir James Simpson in 1847. He was denounced by the Scottish clergy for trying to counter the Divine Will.

Queen Victoria was pregnant with the child who was to be Prince Leopold. Having had several children, she was not anxious to experience another childbirth without pain relief. She called in her obstetrician, who informed her that the anesthesia she heard about was forbidden by the Church. As head of the Church of England she declared it proper for herself. Dr. John Snow was called in to administer chloroform for her deliveries in 1853 and 1857. The Ladies-in-Waiting watched this, thought it a miracle, and demanded for themselves "Anesthesia a la Reine," and they were allowed it. This can be called one step forward in the Women's Liberation Movement.

There is no documentation of early anesthetists at Jefferson after Drs. Mütter and Mitchell. Probably the surgical house staff and the operating room nurses provided that service, without training except what they learned from each other. It took many years for surgeons to realize that anesthetics produced less harm if they were administered by trained persons. Surgeons also had very little "training," usually acquired by "walking the wards," or acting as "dressers," or watching from the gallery how the master worked. In the *Gross Clinic* of 1875, Eakins depicted anesthetist Dr. William Joseph Hearn, who regularly gave ether or chloroform for Dr. Gross.[4] Physicians aspiring to become surgeons would work in the surgical clinic and give anesthesia for the chief. They were frequently referred to as "etherizers." Through this system Dr. Hearn became a Clinical Professor of Surgery at Jefferson.

Dr. Laurence Turnbull, a fellow graduate with Edward R. Squibb in the Jefferson Class of 1845, was appointed Aural Surgeon to the first Jefferson Hospital in 1877. In 1878 he published the first edition of his textbook *Artificial Anesthesia: A Manual of Anesthetic Agents and their Employment in the Treatment of Diseases.* This treatise of over 500 pages covered all aspects of what was known about anesthesia up to that time and went through four editions.

■ Era of Nurse Anesthetists

Medical schools had no formal courses in anesthesia, and what little the students learned was taught by the nurse anesthetists. In practice in the small towns of that era, the family doctors administered anesthesia for each other, or showed a family member how to do it, as they operated with the patient on the kitchen table.

The first formal training in anesthesia in the United States occurred in Cleveland, at Lakeside Hospital of Western Reserve University, where a school of nurse anesthetists was founded in 1905. The formal training of nurse anesthetists at Jefferson started around 1926. Miss Louise Graves, a graduate from the Jefferson School of Nursing in the Class of 1920, enrolled in a course in anesthesia at the Cook County Hospital in Chicago. She was engaged by Jefferson as head anesthetist and assigned to train a class of six students, with Dr. Edward Klopp as physician supervisor. The first six months were under strict supervision, with some academic instruction, but the course was mainly practical. During the second six months the students gave anesthesia on their own, except when they required assistance. After one year they received a certificate as "Qualifed Anesthetist" and were eligible to become regular staff anesthetists at Jefferson or elsewhere. Some would become employed as private anesthetists to certain Jefferson surgeons, as, for example, to Drs. Warren B. Davis or Lewis C. Scheffey.

Miss Graves left Jefferson as head anesthetist around 1934 and was followed in succession by Dorothy Brinkman, Isabelle Widing Oaks, and Sylvia Vlam Cole in 1937. The latter instructed until 1947 and was succeeded by Nellie Maloney Moses, who remained in charge until the beginning of anesthesiology under Dr. Lewis Hampton in 1957. After Dr. Klopp's death in 1936, the physician supervisors were Drs. Alan Parker, Howard Bradshaw (Figure 39-3), James Surver, and George J. Willauer.

Dr. Thomas B. Mervine (Jefferson, 1940) was appointed Instructor in Anesthesiology in the Department of Surgery in 1944 and served in that capacity until 1953. He was the first to use intravenous pentothal at Jefferson and to institute routine intravenous infusion at the start of surgery, and he did many of the early endotracheal intubations. He also worked closely with Dr. William T. Lemmon in the early use of continuous spinal anesthesia. Mervine rose through the academic ranks to Clinical Professor of Surgery, became Honorary in 1982, and served as President of the Alumni Association in 1980.

World War II was a milestone in the development of anesthesia practice. Before the war, ether was the common general anesthetic, with nitrous oxide and chloroform also in use. The induction of anesthesia often required half an hour, with a strenuous excitement stage. The physiological abuse was almost unbelievable. There were no intravenous infusions. There was no endotracheal intubation. There were no muscle relaxants. There was no assisted or controlled ventilation. There were no physician anesthesiologists. At Jefferson the task was

FIG. 39-3. Howard Bradshaw, M.D., and Nurse Anesthetist Staff (1939). Sylvia Vlam Cole, front left; Martha Garver Long, front right, and Nellie Maloney Moses, behind Dr. Bradshaw.

extremely difficult because of the dispersion of the operating rooms in six different locations. Since both ether and cyclopropane are explosive, cumbersome methods were required to avoid sparks, flames, cautery, or other forms of ignition. The Bovie electrocoagulation machine could not be used. Despite these precautions a tragic explosion occurred in 1939 in the fourteenth floor operating room of the Thompson Annex. Dr. Thomas A. Shallow and Louis H. Clerf were performing their operation of combined one-stage pharyngeal diverticulectomy, aided by insertion of the esophagoscope. Nitrous oxide followed by closed circuit ether was being administered when an electric spark set off an explosion. The patient died of internal injuries, the clothing of the nurse anethestist caught fire, and some members of the operating team suffered burns of the face.

After World War II a great deal changed. The pharmacy made intravenous sets and supplied intravenous fluids. Interns and residents learned how to insert intravenous needles that could stay in place. Plastic was not yet available; endotracheal intubation was used for special cases. Intravenous drugs were used to ease inductions, and controlled respiration and muscle relaxants were introduced. Some things had yet to change: Anesthesia for Dr. John H. Gibbon, Jr.'s historic open heart operation with use of the heart-lung machine was administered by a nurse anesthetist as late as May 6, 1953.

Physician Anesthesiologists

The first Medical School Department of Anesthesia in the United States was founded in 1932 at the University of Wisconsin in Madison. It originated through a visit of the Professor of Surgery to Dubuque, Iowa. In the operating room to watch a particularly difficult operation, he was impressed with how easily it was accomplished. He realized that this was due to the excellent anesthesia, and soon he was watching the anesthetist, Dr. Ralph Waters, rather than the surgeon, because Dr. Waters gave a sterling performance. This experience led to Dr. Waters' becoming Professor of Anesthesia at Wisconsin and founding the first residency program in the country. All the rest are his descendants, because his students spread to become professors elsewhere. It took until the 1970s before there was a formal Department of Anesthesia in every medical school of the United States.

Jefferson's most important contribution to anesthesia was made by a surgeon, Dr. William T. Lemmon (Figure 39-4). He was born in South Carolina in 1896 as one of 13 children, three of whom became physicians. After graduation from Clemson College in South Carolina (B.S., 1917) he entered Jefferson Medical College where he received his M.D. degree in 1921. Following his internship at Jefferson Hospital (1921–1923) he began his surgical career by a preceptorship with Dr. Thomas A. Shallow and by teaching gross anatomy at the Daniel Baugh Institute. He maintained an intense interest in anatomy throughout life and was respectfully dubbed "the

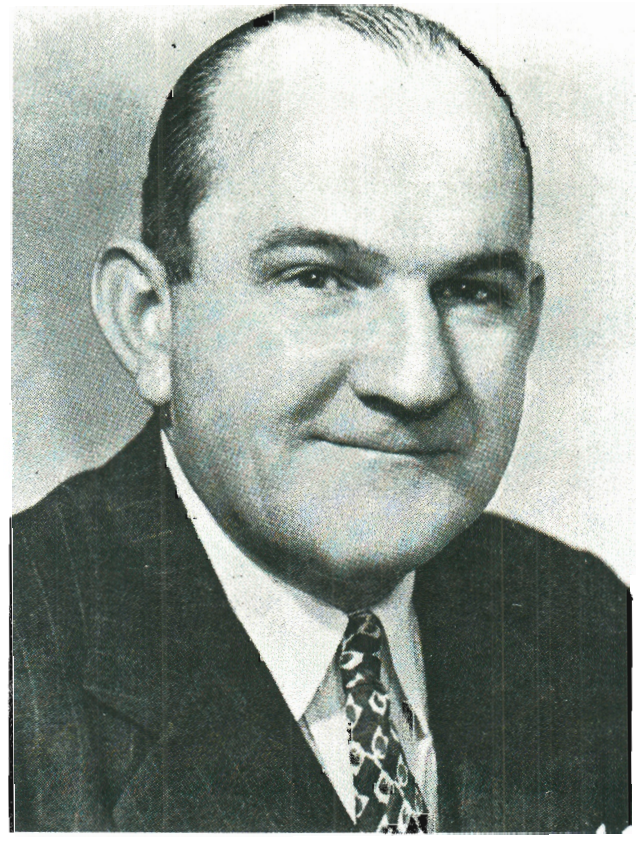

FIG. 39-4. William T. Lemmon, M.D., originator of continuous spinal anesthesia.

last of the great general surgeons" because his operations extended from the brain to the toe. He rose to the rank of Professor of Surgery in 1953.

In 1939 Dr. Lemmon presented to the Philadelphia Academy of Surgery a method of continuous spinal anesthesia that adapted spinal anesthesia for lengthy operations.[5] At this time there were practically no professional physician anesthesiologists. Nurses administered general anesthesia, but surgeons performed their own local anesthesia, nerve blocks, and spinal anesthesias. Surgeons inserted the needles and injected the drug, then left the patient in the care of the nurse while they scrambled to do the operation.

The drug used for local or spinal anesthesia and nerve blocks was procaine. Its duration of action is about 45 minutes. By increasing the concentration and adding epinephrine, the duration can be increased to about 1¼ hours. As surgery became more complex, operations took longer, and sometimes the anesthesia wore off before the operation was finished. The patient then had to be given general anesthesia, considered undesirable to begin with and worse at that point after the patient had gone through an hour of surgery.

Dr. Lemmon thought of a simple but brilliant solution. He left the needle in the spine, attached a rubber tube to it, and attached a syringe to the other end. When the effect of the initial spinal drug started to wear off, he injected more through the tube and needle to reestablish the effectiveness of the anesthesia. Thus was born the concept of "continuous spinal," later extended to continuous epidural and other blocks. The basic principle of the most common and valued technique of anesthesia for childbirth was thus elucidated by a Jefferson surgeon.

Modifications of his technique made it technically easier. These consisted of an operating table with a split mattress, so the protruding needle in the back was not dislodged, and a malleable needle that could be bent to be flush with the skin. Later a plastic catheter was inserted through the needle and provided the flexibility that made it applicable to every case. The millions of women who have painless childbirth every year may thank Dr. Lemmon and Jefferson for this development. His name has been memorialized by his family and son, William T. Lemmon, Jr. (Jefferson, 1960), also a surgeon on the Jefferson staff, who established a prize awarded annually to a senior student who has done original clinical work or writing in the field of anesthesiology.

Jefferson surgeons became experts with spinal anesthesia. The legendary Dr. George J. Willauer, who was nominal head of the nurse anesthesia service for some years, had extraordinary skill with thoracic operations using the Lemmon technique of continuous spinal anesthesia. He or his associate inserted the spinal needle, attached the tubing and syringe, and administered procaine into the intrathecal space. The anesthetic level was advanced until the patient had anesthesia up to the clavicle. Rib resections, thoracoplasties, and sometimes thoracotomies were then performed. The patient breathed spontaneously, with supplementary oxygen, and responded to the surgeon's questions. The operating room nurse would inject more procaine into the spinal canal upon request. The patient's blood pressure usually settled at 70 to 80 systolic, providing induced hypotension and making the surgery relatively bloodless and swift. Willauer reported more than 500 operations done in this way.[6,7] Many subsequent ones were performed in conjunction with Dr. Charles Fineberg, his young assistant, who later became a Professor of Surgery.

A second significant contribution of Jefferson surgeons to anesthesiology consisted in the development of the Jefferson Ventilator (Figure 39-5 and 39-6). The patent obtained by Dr. George J. Haupt (Jefferson, 1945) was assigned by him to Jefferson Medical College. He was aided in this work by Drs. Frank F. Allbritten, Jr. and Jose H. Amadeo (Jefferson, 1952) who co-investigated expiratory assistance as a means of improving ventilation and avoiding respiratory acidosis during anesthesia.[8] Dr. Bernard J. Miller (Jefferson, 1943) had previously conducted research on the important role of expiratory assistance during anesthesia. It was the same Dr. Miller who was closely associated with Dr. Gibbon in the design of electronics and other components for the heart-lung machine.

Throughout the years, artificial respiration was conducted by various methods, mostly ineffective. The iron lung was developed around 1929 by Philip Drinker, a chemical engineer.[9] Although effective, it was a massive, cumbersome machine in which the entire patient, except for the exposed

head, was placed. Dr. Clarence Crafoord, a Swedish surgeon, developed a crude positive pressure ventilator. Subsequently, the Jefferson surgeons in the early 1950s created a ventilator that could be used easily and could be adjusted to deliver the desired amount of pulmonary ventilation. The Jefferson Ventilator was the prototype of the thousands of volume ventilators used throughout the world in operating rooms and intensive care units. Untold numbers of patients owe their lives to this development.

Louis J. Hampton, M.D.; First Chairman of Anesthesiology (1955-1964)

The first Chairman of Anesthesiology at Jefferson was Dr. Louis J. Hampton (Figure 39-7), appointed June 20, 1955. A native Pennsylvanian, born in 1909, he obtained his B.S. degree from Franklin and Marshall College in 1929 and his M.D. degree from the University of Pennsylvania in 1933. After internship at the Presbyterian Hospital of Philadelphia (1933–1935), he began private practice on the staff of Monroe County General Hospital (1936–1941) in East Stroudsburg, Pennsylvania, while pursuing special study in cardiology and anesthesiology at the Graduate and University of Pennsylvania Hospitals (1933–1940). He served in the Army in World War II (1941–1945) at Camp Lee, Virginia, at the U.S. Army First Evacuation Hospital and at Walter Reed Hospital. Following a residency in anesthesiology

FIG. 39-5. The Jefferson Ventilator.

FIG. 39-6. The Jefferson Ventilator being used to assist ventilation of a patient during an operation. George A. Willauer, M.D., surgeon, is in the center, with nurse anesthetist Nellie Maloney Moses at the right.

at the Hartford Hospital (1945–1946), he was certified by the American Board of Anesthesiology in 1947. His academic career in anesthesiology started at Yale University School of Medicine, where between 1946 and 1956 he rose in rank from Instructor to Associate Professor.

Before coming to Jefferson, Dr. Hampton had contributed to the literature of anesthesiology in a broad spectrum of subjects that included his experience with anesthesia in an army hospital in New Guinea, laryngeal edema complicating endotracheal anesthesia in children, sudden death after operation from aspiration after extubation of the endotracheal tube, asphyxia neonatorum, controlled hypotension in anesthesia, anesthesia for surgical correction of cardiorespiratory anomalies, and pharmacologic agents in anesthesia, especially succinylcholine as a muscle relaxant.

FIG. 39-7. Louis J. Hampton, M.D.; First Chairman of Anesthesiology (1955–1964).

Dr. Hampton's scholarly nature was evidenced by his membership in Phi Beta Kappa, Yale Chapter of Sigma Xi, Connecticut State Society of Anesthesiologists (President, 1948), New England Society of Anesthesiologists, American Society of Anesthesiologists, and International Anesthesia Research Society.

A physician anesthesia staff and resident training program were started at Jefferson by Dr. Hampton. His principal further contribution to anesthesiology was the development of a vaporizer for measured amounts of liquid halothane. This was a unique approach to the problem of accuracy of dosage. Following Dr. Hampton's resignation in 1964, Dr. Jay Joshua Jacoby was recruited for the Chair in 1965.

Jay J. Jacoby, M.D., Ph.D.; Second Chairman of Anesthesiology (1965–1984)

A native of New York City, where he was born in 1917, Dr. Jacoby (Figure 39-8) received his B.S. (1939), M.B. (1940), and M.D. (1941) degrees at the University of Minnesota. Afer internship at Kings County Hospital, New York (1941–1942), he became an anesthetist during World War II in the U.S. Army Medical Corps (1942–1945). After serving as the Surgeon of an air base near the North Pole, he was Anesthetist at the 40th General and 160th General Hospitals in England and France, and then with the 3rd Auxiliary Surgical Group of the First Army, from the Battle of the Bulge to the linking up with the Russian Army in Leipzig. His subsequent military career encompassed lecturer-consultant duties for the Navy (1959–1965), the Air Force (1958–1965), and the Army (1966–1984). Upon returning to civilian life he became an Instructor in Anesthesiology at the University of Chicago (1946–1947) and earned a Ph.D. degree in Pharmacology. He then accepted the Directorship of the Department of Anesthesia and title of Associate Professor (1947–1950) and full Professor (1950–1959) at Ohio State University. The next university to beckon Dr. Jacoby was Marquette, where he served as Professor and Director of the Department of Anesthesiology (1959–1965).

Dr. Jacoby became a Diplomate of the American Board of Anesthesiology in 1948, a Fellow of the American College of Anesthesiologists in 1950 (Member, Board of Governors), and a member of the American Association of University Professors, the Association of University Anesthetists, the American Society of Anesthesiologists (Chairman of the Committee on Residencies and member of the Board of Directors), the International Anesthesia Research Society, the Central Surgical Association, the Ohio Society of Anesthetists (President, 1956), the Pennsylvania State Society of Anesthesiologists, and other related, prestigious societies.

In addition to Alpha Omega Alpha (1941) and Sigma Xi (1947), Jacoby was made an honorary member of the Jefferson Alumni Association in 1975, the same year in which the Senior Class commissioned his portrait for the College. He received the Lindback Award for Outstanding Teaching at Jefferson and similar awards at Ohio State and Marquette before his arrival at Jefferson.

Dr. Jacoby's Chairmanship (1965–1984) was an example of aggressive administration. He expanded the staff from four to 17 physician anesthesiologists.

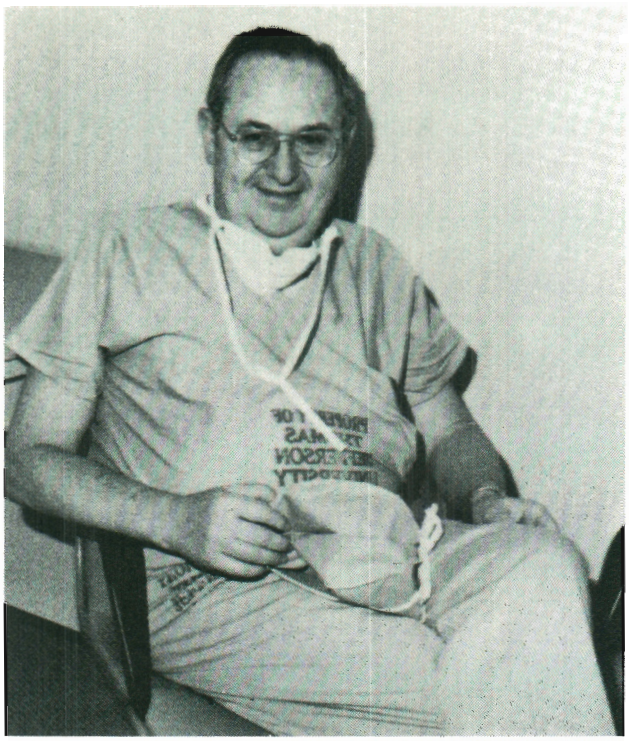

FIG. 39-8. Jay J. Jacoby, M.D., Ph.D.; Second Chairman of Anesthesiology (1965–1984).

The residency program increased from two to 30 participants. The nurses training program was closed, with 11 of the nurse anesthetists remaining as permanent staff members. His continuous tenure as Director and Chairman of Anesthesia Departments in three medical colleges (1947–1984) was among the longest in the United States. He probably attracted as many young people to enter anesthesia, and trained as many Chairmen and Directors of Anesthesia in other institutions, as anyone in the country.

Dr. Jacoby's practical expertise in administering anesthesia was legendary. He handled on a daily basis an almost unbelievable number of requests for his personal services to poor-risk patients, physicians and members of their families, students, and prominent people. To a surgeon at Jefferson, happiness was operating with Dr. Jacoby at the head of the table.

A prolific writer, Jacoby authored approximately 100 articles on anesthesia, including chapters in books. He became internationally known for blind nasal intubation to secure an adequate airway, scientifically labeled *Nasal Endotracheal Intubation by an External Visual Technique*. He developed transtracheal resuscitation and did pioneer work on air embolism during surgery. He originated the Code Blue system of resuscitation in hospitals.[10] Another of his contributions was "Jefferson Solution," which contained a balanced mixture of pentothal for induction and maintenance of anesthesia, curare to relax muscles, and morphine for analgesia. This concoction outside of scientific parlance was also known as "Jacoby's Soup." The indefatigable nature of Dr. Jacoby was further demonstrated when, after achieving Emeritus status in 1984, he preferred to continue on the staff as a practicing anesthesiologist.

In 1970 Dr. Arthur B. Tarrow (Figure 39-9) came to Jefferson as Professor and Associate Chairman. Having been a career Air Force officer, he served as Chief Anesthetist of the Air Force, as Commander of the Clark Field Hospital in the Philippines, as Surgeon of the Pacific Theater (18th Air Force) and finally as Inspector General.

His research involved blood transfusions and plasma substitutes, resuscitation, and rescue and recovery of astronauts. At Jefferson he developed the obstetrical anesthesia service and became a highly popular teacher. He retired in 1985.

Others who were prominent members of the Department were Drs. Harold F. Chase, Robert T. McSherry, William E.B. Scott, Ronald L. Clark, James C. Erickson, and Joseph B. Doto, Jr., Nellie Maloney, Virginia Anderson, Isabelle Widing and Elizabeth Phillips remained in the Department as nurse anesthetists for many years. Rose Marie Tomasello acted as a nurse administrator for more than 20 years.

Joseph L. Seltzer, M.D.; Third Chairman of Anesthesiology (1984–)

In 1984 Dr. Joseph Louis Seltzer (Figure 39-10) was appointed Professor and Chairman of the Department of Anesthesiology. Born in Pennsylvania in 1945, Dr. Seltzer received his B.S. degree (1967) from St. Joseph's College and his M.D. (1971) from Jefferson Medical College. After straight surgical internship at the Chandler Medical Center of the University of Kentucky (1971–1972) he took a Residency in general surgery (1972–1973) at Geisinger Medical Center and in anesthesiology (1973–1975) at Jefferson. He became a staff anesthesiologist at Wright-Patterson Air Force Base, Ohio (1975–1977), Assistant Attending Anesthesiologist of State University Hospital, Syracuse (1977–1980), and, in 1980, Attending Anesthesiologist at Jefferson, until his appointment as Chairman of the Department.

In addition to his academic appointments at Wright State University School of Medicine (Dayton, Ohio), University of New York Upstate Medical Center (Syracuse, New York) and Jefferson, Seltzer became a Fellow of the American College of Anesthesiology (1975) and Diplomate of the American Board of Anesthesiology (1976). He is a member of the American Society of Anesthesiologists, Society of Cardiovascular Anesthesiologists, and Association of Anesthesiologists of Great Britain and Ireland.

In less than a decade he authored or coauthored at least 20 articles relating to hazards and safety measures in anesthesia, as well as physiologic and pharmacologic research in the field. He contributed chapters to books, recorded audiotapes, and made many presentations at distant institutions for meetings or as a Visiting Professor.

Dr. Seltzer entered as Chairman of a Department that had matured under the dedication and wisdom of Dr. Jacoby. His youth, teaching, and research interests were challenged to make anesthesia more of a science, to probe its dangers and blessings ever farther, and to enhance the rich heritage of his alma mater.

FIG. 39-9. Arthur B. Tarrow, M.D., Professor and Associate Chairman of Anesthesiology (1970–1985).

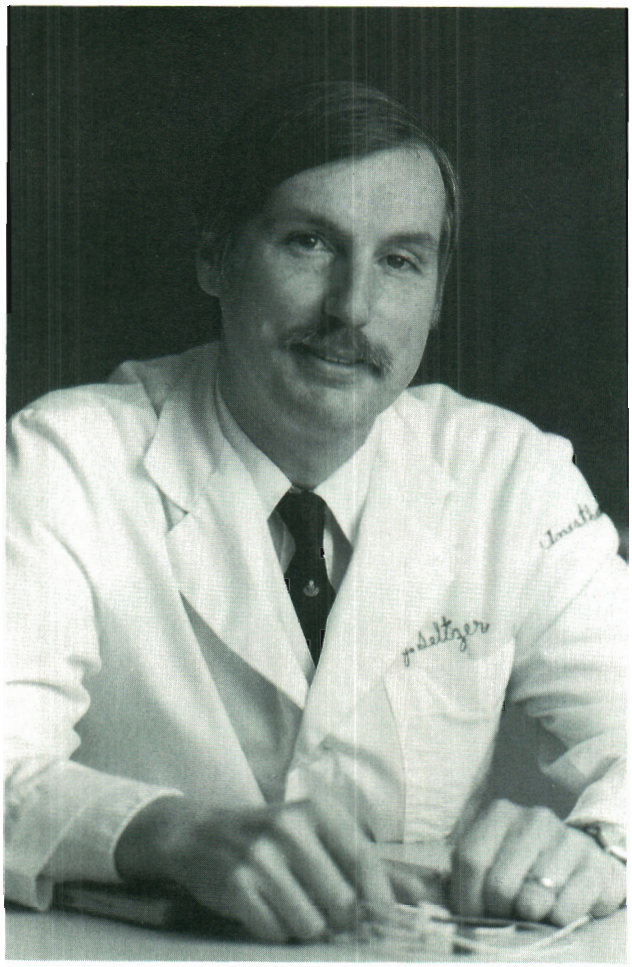

FIG. 39-10. Joseph L. Seltzer, M.D.; Third Chairman of Anesthesiology (1984–)

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